

connected to a data processor for segmenting the visualization of the bone fragment in a displayed image. Both of those items are explicitly set forth in the apparatus of claim 1, and corresponding method steps are set forth in the method of claim 8.

In the Foley et al. reference, a system is disclosed that can be used during a medical or surgical procedure to produce a registration between actual body elements and an image dataset representing the body elements, so that if the body elements are displaced during the procedure, the image dataset can be corrected or updated in order to accurately represent the displaced elements. For this purpose, during the surgical procedure, the system disclosed in the Foley et al. reference identifies the relative position of reference points of each of the body elements, which correspond to reference points in the image dataset, and a processor modifies the image dataset according to the identified relative position of the respective reference points during the procedure.

By contrast, in the method and apparatus disclosed and claimed in the present application, movement of a bone fragment is tracked during a surgical procedure by determining the position of the medical instrument that moves the bone fragment. This information is used to display a segmented representation of the bone fragment.

The Foley et al. reference does not disclose a medical instrument that can be introduced into the body of a patient so as to interact with a bone fragment (or any other anatomical feature) in the body of the subject to move the bone fragment. This is described in the present specification at page 4, last paragraph and page 5, first paragraph. As noted above, in accordance with the present invention the position of this medical instrument is identified while the bone fragment is being moved thereby.

On the basis of the modified position of the medical instrument, the modified position of the bone fragment is determined, using the segmented image, and the corresponding segmented visualization is modified.

At most, the Foley et al. reference discloses a reference frame that can be fixed to a bone. If the bone moves during a surgical procedure the reference frame that is fixed to the bone also moves. There is no disclosure in the Foley et al. reference, however, as to moving the bone by a medical instrument. The frame itself cannot be considered to be a medical instrument that moves the bone. There is no disclosure in the Foley et al. reference as to what causes, or may cause, movement of the bone that causes the corresponding movement of the reference frame. It is entirely plausible that such movement is caused by involuntary responses on the part of the patient, in which case such movement would not be in response to any medical instrument at all.

As also noted by the Examiner, the Foley et al. reference discloses the use of a registration probe for the purpose of identifying the position of the reference points. This is accomplished in a conventional manner by touching the reference points with a tip of the registration probe after these reference points have been exposed by a surgical dissection. The registration probe is simply used to identify the aforementioned reference points, but does not move any of the anatomical structures that it touches.

In addition to the absence of such a medical instrument in the Foley et al. system, there is no disclosure in the Foley et al. reference of segmentation of the image. Image segmentation is a well known image processing tool that is used in the display of medical images, as exemplified by United States Patent Application

Publication No. 2001/055016, cited as Reference AC in the Information Disclosure Statement filed July 20, 2005. No such segmentation is disclosed in the Foley et al. reference, and no use of such segmentation is disclosed for the purpose of identifying the position of a bone fragment.

Therefore, the Foley et al. reference does not disclose all of the elements of independent claim 1 nor all of the method steps of independent claim 8, and thus does not anticipate either of those references. Claims 2-4, 6 and 7 add further structure to the novel combination of claim 1, and claims 9-13, 16 and 17 add further steps to the novel method of claim 8, and therefore none of those dependent claims is anticipated by the Foley et al. reference for the same reasons discussed above in connection with claims 1 and 8.

With regard to apparatus claim 1, although not specifically stated by the Examiner, the Examiner may not have given patentable weight to the function of the medical instrument, since that function is expressed in "adapted for" language. This terminology, however, has always been the standard terminology to avoid "claiming the patient," is not a basis for failing to give patentable weight to this portion of claim 1. Applicants would be willing to consider alternative language to express the same concept, however, if necessary. Moreover, these considerations do not apply at all to the corresponding method step in claim 8.

Claims 5, 14 and 15 were rejected under 35 U.S.C. §103(a) as being unpatentable over Foley et al in view of any of Kienzle, III et al, Suhm or Simon et al. This rejection is also respectfully traversed.

Claim 5 embodies the subject matter of claim 1 therein, and each of claims 14 and 15 embodies the subject matter of claim 8 therein, and therefore the arguments

discussed above with regard to the Foley et al reference are equally applicable to those claims. In view of that discussion, Applicants submit that even if the Foley et al system were further modified in accordance with the teachings of any of Kienzle, III et al or Suhm or Simon et al, the subject matter of claims 5, 14 and 15 still would not result.

All claims of the application are therefore submitted to be patentable over the teachings of the above references, taken singly or in combination. Early consideration of the application is therefore respectfully requested.

Submitted by,

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